Abstracts

A Numerical Model of GaAs MESFET's Including Energy Balance for Microwave Applications

S. Yoganathan, S. Banerjee, T. Itoh, H. Shichijo and S. El-Ghazaly. "A Numerical Model of GaAs MESFET's Including Energy Balance for Microwave Applications." 1991 Microwave and Guided Wave Letters 1.7 (Jul. 1991 [MGWL]): 175-177.

Simulation of submicron semiconductor devices cannot be performed accurately using the drift-diffusion model (DDM), because of its inability to include nonlocal, hot carrier transport phenomena. Devices of these sizes require solution of the Poisson equation and the first three moments of the Boltzmann transport equation (BTE). These equations form a system of time-dependent, nonlinear, coupled, partial differential equations. The differential equations can be numerically solved using coupled or decoupled algorithms. Generally, coupled solvers require larger memory space and me computationally intensive, while conventional decoupled solvers have a limitation on the maximum time step which can be taken for transient solutions to less than the dielectric relaxation time (tau/sub d/). A new decoupled solver has been developed that allows larger time steps than conventional decoupled Gummel algorithms and is less CPU memory and time intensive than coupled Newton solvers.

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